



## SEQUENCE LISTING

<110> Samuel Davis, Nicholas W. Gale, George D. Yancopoulos, and Neil Stahl

<120> METHOD OF ENHANCING THE BIOLOGICAL ACTIVITY OF LIGANDS

<130> REG 670-A-US

<140> USSN 09/868,677

<141> 2001-10-01

<150> PCT/US99/30900

<151> 1999-12-23

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09565677 100101

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Ser	Phe	Phe	Leu	Tyr	Ser	Lys	Leu	Thr	Val	Asp	Lys	Ser	Arg	Trp	Gln
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Thr Leu Thr Phe Pro Asn Ser Thr Glu Glu Ile Lys Ala Tyr Cys Asp	
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210 215 220	



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Cys	Pro	Pro	Cys	Pro	Ala	Pro	Glu	Leu	Leu	Gly	Gly	Pro	Ser	Val	Phe
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Lys	Val	Ser	Asn	Lys	Ala	Leu	Pro	Ala	Pro	Ile	Glu	Lys	Thr	Ile	Ser
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Lys	Ala	Lys	Gly	Gln	Pro	Arg	Glu	Pro	Gln	Val	Tyr	Thr	Leu	Pro	Pro
			580					585					590		
Ser	Arg	Asp	Glu	Leu	Thr	Lys	Asn	Gln	Val	Ser	Leu	Thr	Cys	Leu	Val
		595					600					605			
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	610					615					620				
Gln	Pro	Glu	Asn	Asn	Tyr	Lys	Thr	Thr	Pro	Pro	Val	Leu	Asp	Ser	Asp
625					630					635					640
Gly	Ser	Phe	Phe	Leu	Tyr	Ser	Lys	Leu	Thr	Val	Asp	Lys	Ser	Arg	Trp
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Gln	Gln	Gly	Asn	Val	Phe	Ser	Cys	Ser	Val	Met	His	Glu	Ala	Leu	His
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<211> 2067
<212> DNA
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 $\langle 220 \rangle$ 

<221> CDS

<222> (1) . . . (2064)

$\langle 400 \rangle$  5

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1				5					10					15		
gac	tgt	gca	gat	gta	tat	caa	gct	ggg	ttt	aat	aaa	agt	gga	atc	tac	96
Asp	Cys	Ala	Asp	Val	Tyr	Gln	Ala	Gly	Phe	Asn	Lys	Ser	Gly	Ile	Tyr	
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act	att	tat	att	aat	aat	atg	cca	gaa	ccc	aaa	aag	gtg	ttt	tgc	aat	144
Thr	Ile	Tyr	Ile	Asn	Asn	Met	Pro	Glu	Pro	Lys	Lys	Val	Phe	Cys	Asn	
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Met	Asp	Val	Asn	Gly	Gly	Gly	Trp	Thr	Val	Ile	Gln	His	Arg	Glu	Asp	
	50					55					60					
gga	agt	cta	gat	ttc	caa	aga	ggc	tgg	aag	gaa	tat	aaa	atg	ggg	ttt	240
Gly	Ser	Leu	Asp	Phe	Gln	Arg	Gly	Trp	Lys	Glu	Tyr	Lys	Met	Gly	Phe	
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gga	aat	ccc	tcc	ggg	gaa	tat	tgg	ctg	ggg	aat	gag	ttt	att	ttt	gcc	288

Gly	Asn	Pro	Ser	Gly	Glu	Tyr	Trp	Leu	Gly	Asn	Glu	Phe	Ile	Phe	Ala		
				85					90					95			
att	acc	agt	cag	agg	cag	tac	atg	cta	aga	att	gag	tta	atg	gac	tgg	336	
Ile	Thr	Ser	Gln	Arg	Gln	Tyr	Met	Leu	Arg	Ile	Glu	Leu	Met	Asp	Trp		
			100					105					110				
gaa	ggg	aac	cga	gcc	tat	tca	cag	tat	gac	aga	ttc	cac	ata	gga	aat	384	
Glu	Gly	Asn	Arg	Ala	Tyr	Ser	Gln	Tyr	Asp	Arg	Phe	His	Ile	Gly	Asn		
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gaa	aag	caa	aac	tat	agg	ttg	tat	tta	aaa	ggg	cac	act	ggg	aca	gca	432	
Glu	Lys	Gln	Asn	Tyr	Arg	Leu	Tyr	Leu	Lys	Gly	His	Thr	Gly	Thr	Ala		
	130					135					140						
gga	aaa	cag	agc	agc	ctg	atc	tta	cac	ggg	gct	gat	ttc	agc	act	aaa	480	
Gly	Lys	Gln	Ser	Ser	Leu	Ile	Leu	His	Gly	Ala	Asp	Phe	Ser	Thr	Lys		
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gat	gct	gat	aat	gac	aac	tgt	atg	tgc	aaa	tgt	gcc	ctc	atg	tta	aca	528	
Asp	Ala	Asp	Asn	Asp	Asn	Cys	Met	Cys	Lys	Cys	Ala	Leu	Met	Leu	Thr		
			165					170						175			
gga	gga	tgg	tgg	ttt	gat	gct	tgt	ggc	ccc	tcc	aat	cta	aat	gga	atg	576	
Gly	Gly	Trp	Trp	Phe	Asp	Ala	Cys	Gly	Pro	Ser	Asn	Leu	Asn	Gly	Met		
		180					185					190					
ttc	tat	act	gcg	gga	caa	aac	cat	gga	aaa	ctg	aat	ggg	ata	aag	tgg	624	
Phe	Tyr	Thr	Ala	Gly	Gln	Asn	His	Gly	Lys	Leu	Asn	Gly	Ile	Lys	Trp		
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Ile	Arg	Pro	Leu	Asp	Phe	Gly	Pro	Gly	Glu	Pro	Lys	Ser	Cys	Asp	Lys		
	225				230				235					240			
act	cac	aca	tgc	cca	ccg	tgc	cca	gca	cct	gaa	ctc	ctg	ggg	gga	ccg	768	
Thr	His	Thr	Cys	Pro	Pro	Cys	Pro	Ala	Pro	Glu	Leu	Leu	Gly	Gly	Pro		
			245					250					255				
tca	gtc	ttc	ctc	ttc	ccc	cca	aaa	ccc	aag	gac	acc	ctc	atg	atc	tcc	816	
Ser	Val	Phe	Leu	Phe	Pro	Pro	Lys	Pro	Lys	Asp	Thr	Leu	Met	Ile	Ser		
		260					265					270					
cgg	acc	cct	gag	gtc	aca	tgc	gtg	gtg	gtg	gac	gtg	agc	cac	gaa	gac	864	
Arg	Thr	Pro	Glu	Val	Thr	Cys	Val	Val	Val	Asp	Val	Ser	His	Glu	Asp		
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cct	gag	gtc	aag	ttc	aac	tgg	tac	gtg	gac	ggc	gtg	gag	gtg	cat	aat	912	
Pro	Glu	Val	Lys	Phe	Asn	Trp	Tyr	Val	Asp	Gly	Val	Glu	Val	His	Asn		
	290				295					300							
gcc	aag	aca	aag	ccg	cgg	gag	gag	cag	tac	aac	agc	acg	tac	cgt	gtg	960	
Ala	Lys	Thr	Lys	Pro	Arg	Glu	Glu	Gln	Tyr	Asn	Ser	Thr	Tyr	Arg	Val		
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gtc	agc	gtc	ctc	acc	gtc	ctg	cac	cag	gac	tgg	ctg	aat	ggc	aag	gag	1008	
Val	Ser	Val	Leu	Thr	Val	Leu	His	Gln	Asp	Trp	Leu	Asn	Gly	Lys	Glu		

09853677.100101

325										330										335																			
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340										345										350																			
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435										440										445																			
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450										455										460																			
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500										505										510																			
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565										570										575																			

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Tyr Ser Gln Tyr Asp Arg Phe His Ile Gly Asn Glu Lys Gln Asn Tyr	
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agg ttg tat tta aaa ggt cac act ggg aca gca gga aaa cag agc agc	1824
Arg Leu Tyr Leu Lys Gly His Thr Gly Thr Ala Gly Lys Gln Ser Ser	
595 600 605	
ctg atc tta cac ggt gct gat ttc agc act aaa gat gct gat aat gac	1872
Leu Ile Leu His Gly Ala Asp Phe Ser Thr Lys Asp Ala Asp Asn Asp	
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aac tgt atg tgc aaa tgt gcc ctc atg tta aca gga gga tgg tgg ttt	1920
Asn Cys Met Cys Lys Cys Ala Leu Met Leu Thr Gly Gly Trp Trp Phe	
625 630 635 640	
gat gct tgt ggc ccc tcc aat cta aat gga atg ttc tat act gcg gga	1968
Asp Ala Cys Gly Pro Ser Asn Leu Asn Gly Met Phe Tyr Thr Ala Gly	
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Gln Asn His Gly Lys Leu Asn Gly Ile Lys Trp His Tyr Phe Lys Gly	
660 665 670	
cca agt tac tcc tta cgt tcc aca act atg atg att cga cct tta gat	2064
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 <213> Homo sapiens

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Thr Ile Tyr Ile Asn Asn Met Pro Glu Pro Lys Lys Val Phe Cys Asn	
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Gly Ser Leu Asp Phe Gln Arg Gly Trp Lys Glu Tyr Lys Met Gly Phe	
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Gly Asn Pro Ser Gly Glu Tyr Trp Leu Gly Asn Glu Phe Ile Phe Ala	
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Ile Thr Ser Gln Arg Gln Tyr Met Leu Arg Ile Glu Leu Met Asp Trp	
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Glu Gly Asn Arg Ala Tyr Ser Gln Tyr Asp Arg Phe His Ile Gly Asn	
115 120 125	
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130 135 140	
Gly Lys Gln Ser Ser Leu Ile Leu His Gly Ala Asp Phe Ser Thr Lys	
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Asp Ala Asp Asn Asp Asn Cys Met Cys Lys Cys Ala Leu Met Leu Thr	
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Gly Gly Trp Trp Phe Asp Ala Cys Gly Pro Ser Asn Leu Asn Gly Met	
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Phe	Tyr	Thr	Ala	Gly	Gln	Asn	His	Gly	Lys	Leu	Asn	Gly	Ile	Lys	Trp	195	200	205
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Ile	Arg	Pro	Leu	Asp	Phe	Gly	Pro	Gly	Glu	Pro	Lys	Ser	Cys	Asp	Lys	225	230	235
Thr	His	Thr	Cys	Pro	Pro	Cys	Pro	Ala	Pro	Glu	Leu	Leu	Gly	Gly	Pro	245	250	255
Ser	Val	Phe	Leu	Phe	Pro	Pro	Lys	Pro	Lys	Asp	Thr	Leu	Met	Ile	Ser	260	265	270
Arg	Thr	Pro	Glu	Val	Thr	Cys	Val	Val	Val	Asp	Val	Ser	His	Glu	Asp	275	280	285
Pro	Glu	Val	Lys	Phe	Asn	Trp	Tyr	Val	Asp	Gly	Val	Glu	Val	His	Asn	290	295	300
Ala	Lys	Thr	Lys	Pro	Arg	Glu	Glu	Gln	Tyr	Asn	Ser	Thr	Tyr	Arg	Val	305	310	315
Val	Ser	Val	Leu	Thr	Val	Leu	His	Gln	Asp	Trp	Leu	Asn	Gly	Lys	Glu	325	330	335
Tyr	Lys	Cys	Lys	Val	Ser	Asn	Lys	Ala	Leu	Pro	Ala	Pro	Ile	Glu	Lys	340	345	350
Thr	Ile	Ser	Lys	Ala	Lys	Gly	Gln	Pro	Arg	Glu	Pro	Gln	Val	Tyr	Thr	355	360	365
Leu	Pro	Pro	Ser	Arg	Asp	Glu	Leu	Thr	Lys	Asn	Gln	Val	Ser	Leu	Thr	370	375	380
Cys	Leu	Val	Lys	Gly	Phe	Tyr	Pro	Ser	Asp	Ile	Ala	Val	Glu	Trp	Glu	385	390	395
Ser	Asn	Gly	Gln	Pro	Glu	Asn	Asn	Tyr	Lys	Thr	Thr	Pro	Pro	Val	Leu	405	410	415
Asp	Ser	Asp	Gly	Ser	Phe	Phe	Leu	Tyr	Ser	Lys	Leu	Thr	Val	Asp	Lys	420	425	430
Ser	Arg	Trp	Gln	Gln	Gly	Asn	Val	Phe	Ser	Cys	Ser	Val	Met	His	Glu	435	440	445
Ala	Leu	His	Asn	His	Tyr	Thr	Gln	Lys	Ser	Leu	Ser	Leu	Ser	Pro	Gly	450	455	460
Lys	Gly	Gly	Gly	Gly	Ser	Gly	Ala	Pro	Phe	Arg	Asp	Cys	Ala	Asp	Val	465	470	475
Tyr	Gln	Ala	Gly	Phe	Asn	Lys	Ser	Gly	Ile	Tyr	Thr	Ile	Tyr	Ile	Asn	485	490	495
Asn	Met	Pro	Glu	Pro	Lys	Lys	Val	Phe	Cys	Asn	Met	Asp	Val	Asn	Gly	500	505	510
Gly	Gly	Trp	Thr	Val	Ile	Gln	His	Arg	Glu	Asp	Gly	Ser	Leu	Asp	Phe	515	520	525
Gln	Arg	Gly	Trp	Lys	Glu	Tyr	Lys	Met	Gly	Phe	Gly	Asn	Pro	Ser	Gly	530	535	540
Glu	Tyr	Trp	Leu	Gly	Asn	Glu	Phe	Ile	Phe	Ala	Ile	Thr	Ser	Gln	Arg	545	550	555
Gln	Tyr	Met	Leu	Arg	Ile	Glu	Leu	Met	Asp	Trp	Glu	Gly	Asn	Arg	Ala	565	570	575
Tyr	Ser	Gln	Tyr	Asp	Arg	Phe	His	Ile	Gly	Asn	Glu	Lys	Gln	Asn	Tyr	580	585	590
Arg	Leu	Tyr	Leu	Lys	Gly	His	Thr	Gly	Thr	Ala	Gly	Lys	Gln	Ser	Ser	595	600	605
Leu	Ile	Leu	His	Gly	Ala	Asp	Phe	Ser	Thr	Lys	Asp	Ala	Asp	Asn	Asp	610	615	620
Asn	Cys	Met	Cys	Lys	Cys	Ala	Leu	Met	Leu	Thr	Gly	Gly	Trp	Trp	Phe	625	630	635
Asp	Ala	Cys	Gly	Pro	Ser	Asn	Leu	Asn	Gly	Met	Phe	Tyr	Thr	Ala	Gly	645	650	655
Gln	Asn	His	Gly	Lys	Leu	Asn	Gly	Ile	Lys	Trp	His	Tyr	Phe	Lys	Gly	660	665	670
Pro	Ser	Tyr	Ser	Leu	Arg	Ser	Thr	Thr	Met	Met	Ile	Arg	Pro	Leu	Asp			

675

680

685

&lt;210&gt; 7

&lt;211&gt; 2070

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&lt;213&gt; Homo sapiens

&lt;220&gt;

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Asp Cys Ala Glu Val Phe Lys Ser Gly His Thr Thr Asn Gly Ile Tyr	
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acg tta aca ttc cct aat tct aca gaa gag atc aag gcc tac tgt gac	144
Thr Leu Thr Phe Pro Asn Ser Thr Glu Glu Ile Lys Ala Tyr Cys Asp	
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Met Glu Ala Gly Gly Gly Gly Trp Thr Ile Ile Gln Arg Arg Glu Asp	
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Gly Ser Val Asp Phe Gln Arg Thr Trp Lys Glu Tyr Lys Val Gly Phe	
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Leu Thr Asn Gln Gln Arg Tyr Val Leu Lys Ile His Leu Lys Asp Trp	
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gaa ggg aat gag gct tac tca ttg tat gaa cat ttc tat ctc tca agt	384
Glu Gly Asn Glu Ala Tyr Ser Leu Tyr Glu His Phe Tyr Leu Ser Ser	
115 120 125	
gaa gaa ctc aat tat agg att cac ctt aaa gga ctt aca ggg aca gcc	432
Glu Glu Leu Asn Tyr Arg Ile His Leu Lys Gly Leu Thr Gly Thr Ala	
130 135 140	
ggc aaa ata agc agc atc agc caa cca gga aat gat ttt agc aca aag	480
Gly Lys Ile Ser Ser Ile Ser Gln Pro Gly Asn Asp Phe Ser Thr Lys	
145 150 155 160	
gat gga gac aac gac aaa tgt att tgc aaa tgt tca caa atg cta aca	528
Asp Gly Asp Asn Asp Lys Cys Ile Cys Lys Cys Ser Gln Met Leu Thr	
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Gly Gly Trp Trp Phe Asp Ala Cys Gly Pro Ser Asn Leu Asn Gly Met	
180 185 190	

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Tyr Tyr Pro Gln Arg Gln Asn Thr Asn Lys Phe Asn Gly Ile Lys Trp	
195 200 205	
tac tac tgg aaa ggc tca ggc tat tgc ctc aag gcc aca acc atg atg	672
Tyr Tyr Trp Lys Gly Ser Gly Tyr Ser Leu Lys Ala Thr Thr Met Met	
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Ile Arg Pro Ala Asp Phe Gly Gly Pro Gly Glu Pro Lys Ser Cys Asp	
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Lys Thr His Thr Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu Gly Gly	
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Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile	
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Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val Ser His Glu	
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Glu Tyr Lys Cys Lys Val Ser Asn Lys Ala Leu Pro Ala Pro Ile Glu	
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370 375 380	
acc tgc ctg gtc aaa ggc ttc tat ccc agc gac atc gcc gtg gag tgg	1200
Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp	
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Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Val	
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ctg gac tcc gac ggc tcc ttc ttc ctc tac agc aag ctc acc gtg gac	1296
Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp	
420 425 430	
aag agc agg tgg cag cag ggg aac gtc ttc tca tgc tcc gtg atg cat	1344



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gag	gct	ctg	cac	aac	cac	tac	acg	cag	aag	agc	ctc	tcc	ctg	tct	ccg		1392
Glu	Ala	Leu	His	Asn	His	Tyr	Thr	Gln	Lys	Ser	Leu	Ser	Leu	Ser	Pro		
	450					455					460						
ggt	aaa	ggc	ggt	ggc	ggt	tct	ggc	gcg	cct	aga	gac	tgt	gct	gaa	gta		1440
Gly	Lys	Gly	Gly	Gly	Gly	Ser	Gly	Ala	Pro	Arg	Asp	Cys	Ala	Glu	Val		
465					470					475				480			
ttc	aaa	tca	gga	cac	acc	aca	aat	ggc	atc	tac	acg	tta	aca	ttc	cct		1488
Phe	Lys	Ser	Gly	His	Thr	Thr	Asn	Gly	Ile	Tyr	Thr	Leu	Thr	Phe	Pro		
				485					490					495			
aat	tct	aca	gaa	gag	atc	aag	gcc	tac	tgt	gac	atg	gaa	gct	gga	gga		1536
Asn	Ser	Thr	Glu	Glu	Ile	Lys	Ala	Tyr	Cys	Asp	Met	Glu	Ala	Gly	Gly		
			500					505					510				
ggc	ggg	tgg	aca	att	att	cag	cga	cgt	gag	gat	ggc	agc	gtt	gat	ttt		1584
Gly	Gly	Trp	Thr	Ile	Ile	Gln	Arg	Glu	Asp	Gly	Ser	Val	Asp	Phe			
	515					520						525					
cag	agg	act	tgg	aaa	gaa	tat	aaa	gtg	gga	ttt	ggt	aac	cct	tca	gga		1632
Gln	Arg	Thr	Trp	Lys	Glu	Tyr	Lys	Val	Gly	Phe	Gly	Asn	Pro	Ser	Gly		
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gaa	tat	tgg	ctg	gga	aat	gag	ttt	gtt	tcg	caa	ctg	act	aat	cag	caa		1680
Glu	Tyr	Trp	Leu	Gly	Asn	Glu	Phe	Val	Ser	Gln	Leu	Thr	Asn	Gln	Gln		
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cgc	tat	gtg	ctt	aaa	ata	cac	ctt	aaa	gac	tgg	gaa	ggg	aat	gag	gct		1728
Arg	Tyr	Val	Leu	Lys	Ile	His	Leu	Lys	Asp	Trp	Glu	Gly	Asn	Glu	Ala		
			565						570					575			
tac	tca	ttg	tat	gaa	cat	ttc	tat	ctc	tca	agt	gaa	gaa	ctc	aat	tat		1776
Tyr	Ser	Leu	Tyr	Glu	His	Phe	Tyr	Leu	Ser	Ser	Glu	Glu	Leu	Asn	Tyr		
		580						585					590				
agg	att	cac	ctt	aaa	gga	ctt	aca	ggg	aca	gcc	ggc	aaa	ata	agc	agc		1824
Arg	Ile	His	Leu	Lys	Gly	Leu	Thr	Gly	Thr	Ala	Gly	Lys	Ile	Ser	Ser		
		595					600					605					
atc	agc	caa	cca	gga	aat	gat	ttt	agc	aca	aag	gat	gga	gac	aac	gac		1872
Ile	Ser	Gln	Pro	Gly	Asn	Asp	Phe	Ser	Thr	Lys	Asp	Gly	Asp	Asn	Asp		
	610					615					620						
aaa	tgt	att	tgc	aaa	tgt	tca	caa	atg	cta	aca	gga	ggc	tgg	tgg	ttt		1920
Lys	Cys	Ile	Cys	Lys	Cys	Ser	Gln	Met	Leu	Thr	Gly	Gly	Trp	Trp	Phe		
625					630					635					640		
gat	gca	tgt	ggt	cct	tcc	aac	ttg	aac	gga	atg	tac	tat	cca	cag	agg		1968
Asp	Ala	Cys	Gly	Pro	Ser	Asn	Leu	Asn	Gly	Met	Tyr	Tyr	Pro	Gln	Arg		
			645						650				655				
cag	aac	aca	aat	aag	ttc	aac	ggc	att	aaa	tgg	tac	tac	tgg	aaa	ggc		2016
Gln	Asn	Thr	Asn	Lys	Phe	Asn	Gly	Ile	Lys	Trp	Tyr	Tyr	Trp	Lys	Gly		
			660					665					670				
tca	ggc	tat	tcg	ctc	aag	gcc	aca	acc	atg	atg	atc	cga	cca	gca	gat		2064
Ser	Gly	Tyr	Ser	Leu	Lys	Ala	Thr	Thr	Met	Met	Ile	Arg	Pro	Ala	Asp		

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680

685

2070

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Phe

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<213> Homo sapiens

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Thr	Leu	Thr	Phe	Pro	Asn	Ser	Thr	Glu	Glu	Ile	Lys	Ala	Tyr	Cys	Asp
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Met	Glu	Ala	Gly	Gly	Gly	Gly	Trp	Thr	Ile	Ile	Gln	Arg	Arg	Glu	Asp
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Gly	Ser	Val	Asp	Phe	Gln	Arg	Thr	Trp	Lys	Glu	Tyr	Lys	Val	Gly	Phe
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Gly	Asn	Pro	Ser	Gly	Glu	Tyr	Trp	Leu	Gly	Asn	Glu	Phe	Val	Ser	Gln
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Leu	Thr	Asn	Gln	Gln	Arg	Tyr	Val	Leu	Lys	Ile	His	Leu	Lys	Asp	Trp
			100					105					110		
Glu	Gly	Asn	Glu	Ala	Tyr	Ser	Leu	Tyr	Glu	His	Phe	Tyr	Leu	Ser	Ser
		115					120					125			
Glu	Glu	Leu	Asn	Tyr	Arg	Ile	His	Leu	Lys	Gly	Leu	Thr	Gly	Thr	Ala
	130					135					140				
Gly	Lys	Ile	Ser	Ser	Ile	Ser	Gln	Pro	Gly	Asn	Asp	Phe	Ser	Thr	Lys
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Asp	Gly	Asp	Asn	Asp	Lys	Cys	Ile	Cys	Lys	Cys	Ser	Gln	Met	Leu	Thr
			165						170					175	
Gly	Gly	Trp	Trp	Phe	Asp	Ala	Cys	Gly	Pro	Ser	Asn	Leu	Asn	Gly	Met
		180						185					190		
Tyr	Tyr	Pro	Gln	Arg	Gln	Asn	Thr	Asn	Lys	Phe	Asn	Gly	Ile	Lys	Trp
		195					200					205			
Tyr	Tyr	Trp	Lys	Gly	Ser	Gly	Tyr	Ser	Leu	Lys	Ala	Thr	Thr	Met	Met
	210					215					220				
Ile	Arg	Pro	Ala	Asp	Phe	Gly	Gly	Pro	Gly	Glu	Pro	Lys	Ser	Cys	Asp
225					230					235					240
Lys	Thr	His	Thr	Cys	Pro	Pro	Cys	Pro	Ala	Pro	Glu	Leu	Leu	Gly	Gly
			245						250					255	
Pro	Ser	Val	Phe	Leu	Phe	Pro	Pro	Lys	Pro	Lys	Asp	Thr	Leu	Met	Ile
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Ser	Arg	Thr	Pro	Glu	Val	Thr	Cys	Val	Val	Val	Asp	Val	Ser	His	Glu
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Asp	Pro	Glu	Val	Lys	Phe	Asn	Trp	Tyr	Val	Asp	Gly	Val	Glu	Val	His
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Val	Val	Ser	Val	Leu	Thr	Val	Leu	His	Gln	Asp	Trp	Leu	Asn	Gly	Lys
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Glu	Tyr	Lys	Cys	Lys	Val	Ser	Asn	Lys	Ala	Leu	Pro	Ala	Pro	Ile	Glu
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Lys	Thr	Ile	Ser	Lys	Ala	Lys	Gly	Gln	Pro	Arg	Glu	Pro	Gln	Val	Tyr
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Thr	Leu	Pro	Pro	Ser	Arg	Asp	Glu	Leu	Thr	Lys	Asn	Gln	Val	Ser	Leu
	370					375						380			

Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp  
 385 390 395 400  
 Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Val  
 405 410 415  
 Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp  
 420 425 430  
 Lys Ser Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His  
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 Glu Ala Leu His Asn His Tyr Thr Gln Lys Ser Leu Ser Leu Ser Pro  
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 Gly Lys Gly Gly Gly Gly Ser Gly Ala Pro Arg Asp Cys Ala Glu Val  
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 Asn Ser Thr Glu Glu Ile Lys Ala Tyr Cys Asp Met Glu Ala Gly Gly  
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 Gln Arg Thr Trp Lys Glu Tyr Lys Val Gly Phe Gly Asn Pro Ser Gly  
 530 535 540  
 Glu Tyr Trp Leu Gly Asn Glu Phe Val Ser Gln Leu Thr Asn Gln Gln  
 545 550 555 560  
 Arg Tyr Val Leu Lys Ile His Leu Lys Asp Trp Glu Gly Asn Glu Ala  
 565 570 575  
 Tyr Ser Leu Tyr Glu His Phe Tyr Leu Ser Ser Glu Glu Leu Asn Tyr  
 580 585 590  
 Arg Ile His Leu Lys Gly Leu Thr Gly Thr Ala Gly Lys Ile Ser Ser  
 595 600 605  
 Ile Ser Gln Pro Gly Asn Asp Phe Ser Thr Lys Asp Gly Asp Asn Asp  
 610 615 620  
 Lys Cys Ile Cys Lys Cys Ser Gln Met Leu Thr Gly Gly Trp Trp Phe  
 625 630 635 640  
 Asp Ala Cys Gly Pro Ser Asn Leu Asn Gly Met Tyr Tyr Pro Gln Arg  
 645 650 655  
 Gln Asn Thr Asn Lys Phe Asn Gly Ile Lys Trp Tyr Tyr Trp Lys Gly  
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 Phe

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<400> 9

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48

gtc gtg tgg gcg ctg tgc cgg ctc gcc aca ccg ctg gcc aag aac ctg  
 Val Val Trp Ala Leu Cys Arg Leu Ala Thr Pro Leu Ala Lys Asn Leu  
 20 25 30

96

gag ccc gta tcc tgg agc tcc ctc aac ccc aag ttc ctg agt ggg aag  
 Glu Pro Val Ser Trp Ser Ser Leu Asn Pro Lys Phe Leu Ser Gly Lys

144

09888877-100101

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ggc ttg gtg atc tat ccg aaa att gga gac aag ctg gac atc atc tgc			192
Gly Leu Val Ile Tyr Pro Lys Ile Gly Asp Lys Leu Asp Ile Ile Cys			
50	55	60	
ccc cga gca gaa gca ggg cgg ccc tat gag tac tac aag ctg tac ctg			240
Pro Arg Ala Glu Ala Gly Arg Pro Tyr Glu Tyr Tyr Lys Leu Tyr Leu			
65	70	75	80
gtg cgg cct gag cag gca gct gcc tgt agc aca gtt ctc gac ccc aac			288
Val Arg Pro Glu Gln Ala Ala Ala Cys Ser Thr Val Leu Asp Pro Asn			
	85	90	95
gtg ttg gtc acc tgc aat agg cca gag cag gaa ata cgc ttt acc atc			336
Val Leu Val Thr Cys Asn Arg Pro Glu Gln Glu Ile Arg Phe Thr Ile			
	100	105	110
aag ttc cag gag ttc agc ccc aac tac atg ggc ctg gag ttc aag aag			384
Lys Phe Gln Glu Phe Ser Pro Asn Tyr Met Gly Leu Glu Phe Lys Lys			
	115	120	125
cac cat gat tac tac att acc tca aca tcc aat gga agc ctg gag ggg			432
His His Asp Tyr Tyr Ile Thr Ser Thr Ser Asn Gly Ser Leu Glu Gly			
	130	135	140
ctg gaa aac cgg gag ggc ggt gtg tgc cgc aca cgc acc atg aag atc			480
Leu Glu Asn Arg Glu Gly Gly Val Cys Arg Thr Arg Thr Met Lys Ile			
145	150	155	160
atc atg aag gtt ggg caa gat ccc aat gct gtg acg cct gag cag ctg			528
Ile Met Lys Val Gly Gln Asp Pro Asn Ala Val Thr Pro Glu Gln Leu			
	165	170	175
act acc agc agg ccc agc aag gag gca gac aac act gtc aag atg gcc			576
Thr Thr Ser Arg Pro Ser Lys Glu Ala Asp Asn Thr Val Lys Met Ala			
	180	185	190
aca cag gcc cct ggt agt cgg ggc tcc ctg ggt gac tct gat ggc aag			624
Thr Gln Ala Pro Gly Ser Arg Gly Ser Leu Gly Asp Ser Asp Gly Lys			
	195	200	205
cat gag act gtg aac cag gaa gag aag agt ggc cca ggt gca agt ggg			672
His Glu Thr Val Asn Gln Glu Glu Lys Ser Gly Pro Gly Ala Ser Gly			
	210	215	220
ggc agc agc ggg gac cct gat ggc ttc ttc aac tcc aag ggc ccg ggt			720
Gly Ser Ser Gly Asp Pro Asp Gly Phe Phe Asn Ser Lys Gly Pro Gly			
225	230	235	240
aag aac ctg gag ccc gta tcc tgg agc tcc ctc aac ccc aag ttc ctg			768
Lys Asn Leu Glu Pro Val Ser Trp Ser Ser Leu Asn Pro Lys Phe Leu			
	245	250	255
agt ggg aag ggc ttg gtg atc tat ccg aaa att gga gac aag ctg gac			816
Ser Gly Lys Gly Leu Val Ile Tyr Pro Lys Ile Gly Asp Lys Leu Asp			
	260	265	270
atc atc tgc ccc cga gca gaa gca ggg cgg ccc tat gag tac tac aag			864
Ile Ile Cys Pro Arg Ala Glu Ala Gly Arg Pro Tyr Glu Tyr Tyr Lys			
	275	280	285

ctg tac ctg gtg cgg cct gag cag gca gct gcc tgt agc aca gtt ctc	912
Leu Tyr Leu Val Arg Pro Glu Gln Ala Ala Ala Cys Ser Thr Val Leu	
290 295 300	
gac ccc aac gtg ttg gtc acc tgc aat agg cca gag cag gaa ata cgc	960
Asp Pro Asn Val Leu Val Thr Cys Asn Arg Pro Glu Gln Glu Ile Arg	
305 310 315 320	
ttt acc atc aag ttc cag gag ttc agc ccc aac tac atg ggc ctg gag	1008
Phe Thr Ile Lys Phe Gln Glu Phe Ser Pro Asn Tyr Met Gly Leu Glu	
325 330 335	
ttc aag aag cac cat gat tac tac att acc tca aca tcc aat gga agc	1056
Phe Lys Lys His His Asp Tyr Tyr Ile Thr Ser Thr Ser Asn Gly Ser	
340 345 350	
ctg gag ggg ctg gaa aac cgg gag ggc ggt gtg tgc cgc aca cgc acc	1104
Leu Glu Gly Leu Glu Asn Arg Glu Gly Gly Val Cys Arg Thr Arg Thr	
355 360 365	
atg aag atc atc atg aag gtt ggg caa gat ccc aat gct gtg acg cct	1152
Met Lys Ile Ile Met Lys Val Gly Gln Asp Pro Asn Ala Val Thr Pro	
370 375 380	
gag cag ctg act acc agc agg ccc agc aag gag gca gac aac act gtc	1200
Glu Gln Leu Thr Thr Ser Arg Pro Ser Lys Glu Ala Asp Asn Thr Val	
385 390 395 400	
aag atg gcc acâ cag gcc cct ggt agt cgg ggc tcc ctg ggt gac tct	1248
Lys Met Ala Thr Gln Ala Pro Gly Ser Arg Gly Ser Leu Gly Asp Ser	
405 410 415	
gat ggc aag cat gag act gtg aac cag gaa gag aag agt ggc cca ggt	1296
Asp Gly Lys His Glu Thr Val Asn Gln Glu Glu Lys Ser Gly Pro Gly	
420 425 430	
gca agt ggg ggc agc agc ggg gac cct gat ggc ttc ttc aac tcc aaa	1344
Ala Ser Gly Gly Ser Ser Gly Asp Pro Asp Gly Phe Phe Asn Ser Lys	
435 440 445	
ggc ccg ggc gag ccc aaa tct tgt gac aaa act cac aca tgc cca ccg	1392
Gly Pro Gly Glu Pro Lys Ser Cys Asp Lys Thr His Thr Cys Pro Pro	
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Cys Pro Ala Pro Glu Leu Leu Gly Gly Pro Ser Val Phe Leu Phe Pro	
465 470 475 480	
cca aaa ccc aag gac acc ctc atg atc tcc cgg acc cct gag gtc aca	1488
Pro Lys Pro Lys Asp Thr Leu Met Ile Ser Arg Thr Pro Glu Val Thr	
485 490 495	
tgc gtg gtg gtg gac gtg agc cac gaa gac cct gag gtc aag ttc aac	1536
Cys Val Val Val Asp Val Ser His Glu Asp Pro Glu Val Lys Phe Asn	
500 505 510	
tgg tac gtg gac ggc gtg gag gtg cat aat gcc aag aca aag ccg cgg	1584
Trp Tyr Val Asp Gly Val Glu Val His Asn Ala Lys Thr Lys Pro Arg	
515 520 525	



Lys	Phe	Gln	Glu	Phe	Ser	Pro	Asn	Tyr	Met	Gly	Leu	Glu	Phe	Lys	Lys	115	120	125
His	His	Asp	Tyr	Tyr	Ile	Thr	Ser	Thr	Ser	Asn	Gly	Ser	Leu	Glu	Gly	130	135	140
Leu	Glu	Asn	Arg	Glu	Gly	Gly	Val	Cys	Arg	Thr	Arg	Thr	Met	Lys	Ile	145	150	155
Ile	Met	Lys	Val	Gly	Gln	Asp	Pro	Asn	Ala	Val	Thr	Pro	Glu	Gln	Leu	165	170	175
Thr	Thr	Ser	Arg	Pro	Ser	Lys	Glu	Ala	Asp	Asn	Thr	Val	Lys	Met	Ala	180	185	190
Thr	Gln	Ala	Pro	Gly	Ser	Arg	Gly	Ser	Leu	Gly	Asp	Ser	Asp	Gly	Lys	195	200	205
His	Glu	Thr	Val	Asn	Gln	Glu	Glu	Lys	Ser	Gly	Pro	Gly	Ala	Ser	Gly	210	215	220
Gly	Ser	Ser	Gly	Asp	Pro	Asp	Gly	Phe	Phe	Asn	Ser	Lys	Gly	Pro	Gly	225	230	235
Lys	Asn	Leu	Glu	Pro	Val	Ser	Trp	Ser	Ser	Leu	Asn	Pro	Lys	Phe	Leu	245	250	255
Ser	Gly	Lys	Gly	Leu	Val	Ile	Tyr	Pro	Lys	Ile	Gly	Asp	Lys	Leu	Asp	260	265	270
Ile	Ile	Cys	Pro	Arg	Ala	Glu	Ala	Gly	Arg	Pro	Tyr	Glu	Tyr	Tyr	Lys	275	280	285
Leu	Tyr	Leu	Val	Arg	Pro	Glu	Gln	Ala	Ala	Ala	Cys	Ser	Thr	Val	Leu	290	295	300
Asp	Pro	Asn	Val	Leu	Val	Thr	Cys	Asn	Arg	Pro	Glu	Gln	Glu	Ile	Arg	305	310	315
Phe	Thr	Ile	Lys	Phe	Gln	Glu	Phe	Ser	Pro	Asn	Tyr	Met	Gly	Leu	Glu	325	330	335
Phe	Lys	Lys	His	His	Asp	Tyr	Tyr	Ile	Thr	Ser	Thr	Ser	Asn	Gly	Ser	340	345	350
Leu	Glu	Gly	Leu	Glu	Asn	Arg	Glu	Gly	Gly	Val	Cys	Arg	Thr	Arg	Thr	355	360	365
Met	Lys	Ile	Ile	Met	Lys	Val	Gly	Gln	Asp	Pro	Asn	Ala	Val	Thr	Pro	370	375	380
Glu	Gln	Leu	Thr	Thr	Ser	Arg	Pro	Ser	Lys	Glu	Ala	Asp	Asn	Thr	Val	385	390	395
Lys	Met	Ala	Thr	Gln	Ala	Pro	Gly	Ser	Arg	Gly	Ser	Leu	Gly	Asp	Ser	405	410	415
Asp	Gly	Lys	His	Glu	Thr	Val	Asn	Gln	Glu	Glu	Lys	Ser	Gly	Pro	Gly	420	425	430
Ala	Ser	Gly	Gly	Ser	Ser	Gly	Asp	Pro	Asp	Gly	Phe	Phe	Asn	Ser	Lys	435	440	445
Gly	Pro	Gly	Glu	Pro	Lys	Ser	Cys	Asp	Lys	Thr	His	Thr	Cys	Pro	Pro	450	455	460
Cys	Pro	Ala	Pro	Glu	Leu	Gly	Gly	Pro	Ser	Val	Phe	Leu	Phe	Pro		465	470	475
Pro	Lys	Pro	Lys	Asp	Thr	Leu	Met	Ile	Ser	Arg	Thr	Pro	Glu	Val	Thr	485	490	495
Cys	Val	Val	Val	Asp	Val	Ser	His	Glu	Asp	Pro	Glu	Val	Lys	Phe	Asn	500	505	510
Trp	Tyr	Val	Asp	Gly	Val	Glu	Val	His	Asn	Ala	Lys	Thr	Lys	Pro	Arg	515	520	525
Glu	Glu	Gln	Tyr	Asn	Ser	Thr	Tyr	Arg	Val	Val	Ser	Val	Leu	Thr	Val	530	535	540
Leu	His	Gln	Asp	Trp	Leu	Asn	Gly	Lys	Glu	Tyr	Lys	Cys	Lys	Val	Ser	545	550	555
Asn	Lys	Ala	Leu	Pro	Ala	Pro	Ile	Glu	Lys	Thr	Ile	Ser	Lys	Ala	Lys	565	570	575
Gly	Gln	Pro	Arg	Glu	Pro	Gln	Val	Tyr	Thr	Leu	Pro	Pro	Ser	Arg	Asp	580	585	590
Glu	Leu	Thr	Lys	Asn	Gln	Val	Ser	Leu	Thr	Cys	Leu	Val	Lys	Gly	Phe			

09886677 100101

	595		600		605										
Tyr	Pro	Ser	Asp	Ile	Ala	Val	Glu	Trp	Glu	Ser	Asn	Gly	Gln	Pro	Glu
	610					615					620				
Asn	Asn	Tyr	Lys	Thr	Thr	Pro	Pro	Val	Leu	Asp	Ser	Asp	Gly	Ser	Phe
625					630					635					640
Phe	Leu	Tyr	Ser	Lys	Leu	Thr	Val	Asp	Lys	Ser	Arg	Trp	Gln	Gln	Gly
				645					650					655	
Asn	Val	Phe	Ser	Cys	Ser	Val	Met	His	Glu	Ala	Leu	His	Asn	His	Tyr
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<221> CDS  
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<400> 11

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Leu Glu Pro Ile Tyr Trp Asn Ser Ser Asn Ser Lys Phe Leu Pro Gly	
35 40 45	
caa ggc ctg gta cta tac cca cag ata gga gac aaa ttg gat att att	192
Gln Gly Leu Val Leu Tyr Pro Gln Ile Gly Asp Lys Leu Asp Ile Ile	
50 55 60	
tgc ccc aaa gtg gac tct aaa act gtt ggc cag tat gaa tat tat aaa	240
Cys Pro Lys Val Asp Ser Lys Thr Val Gly Gln Tyr Glu Tyr Tyr Lys	
65 70 75 80	
gtt tat atg gtt gat aaa gac caa gca gac aga tgc aca att aag aag	288
Val Tyr Met Val Asp Lys Asp Gln Ala Asp Arg Cys Thr Ile Lys Lys	
85 90 95	
gag aat acc ccg ctg ctc aac tgt gcc aga cca gac caa gat gtg aaa	336
Glu Asn Thr Pro Leu Leu Asn Cys Ala Arg Pro Asp Gln Asp Val Lys	
100 105 110	
ttc acc atc aag ttt caa gaa ttc agc cct aac ctc tgg ggt cta gaa	384
Phe Thr Ile Lys Phe Gln Glu Phe Ser Pro Asn Leu Trp Gly Leu Glu	
115 120 125	
ttt cag aag aac aaa gat tac tac att ata tct aca tca aat ggg tct	432
Phe Gln Lys Asn Lys Asp Tyr Tyr Ile Ile Ser Thr Ser Asn Gly Ser	
130 135 140	
ttg gag ggc ctg gat aac cag gag gga ggg gtg tgc cag aca aga gcc	480



Leu Glu Gly Leu Asp Asn Gln Glu Gly Gly Val Cys Gln Thr Arg Ala	145	150	155	160	
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Met Lys Ile Leu Met Lys Val Gly Gln Asp Ala Ser Ser Ala Gly Ser	165	170	175		
gcc agg aat cac ggt cca aca aga cgt cca gag cta gaa gct ggt aca	576				
Ala Arg Asn His Gly Pro Thr Arg Arg Pro Glu Leu Glu Ala Gly Thr	180	185	190		
aat ggg aga agt tca aca aca agt ccc ttt gtg aag cca aat cca ggt	624				
Asn Gly Arg Ser Ser Thr Thr Ser Pro Phe Val Lys Pro Asn Pro Gly	195	200	205		
tct agc acc gat ggc aac agc gcg ggg cat tcc ggg aac aat ctc ctg	672				
Ser Ser Thr Asp Gly Asn Ser Ala Gly His Ser Gly Asn Asn Leu Leu	210	215	220		
ggg ggc ccg gga ata gtt tta gag cct atc tac tgg aat tcc tgc aac	720				
Gly Gly Pro Gly Ile Val Leu Glu Pro Ile Tyr Trp Asn Ser Ser Asn	225	230	235	240	
tcc aaa ttt cta ccc gga caa ggc ctg gta cta tac cca cag ata gga	768				
Ser Lys Phe Leu Pro Gly Gln Gly Leu Val Leu Tyr Pro Gln Ile Gly	245	250	255		
gac aaa ttg gat att att tgc ccc aaa gtg gac tct aaa act gtt ggc	816				
Asp Lys Leu Asp Ile Ile Cys Pro Lys Val Asp Ser Lys Thr Val Gly	260	265	270		
cag tat gaa tat tat aaa gtt tat atg gtt gat aaa gac caa gca gac	864				
Gln Tyr Glu Tyr Tyr Lys Val Tyr Met Val Asp Lys Asp Gln Ala Asp	275	280	285		
aga tgc aca att aag aag gag aat acc ccg ctg ctc aac tgt gcc aga	912				
Arg Cys Thr Ile Lys Lys Glu Asn Thr Pro Leu Leu Asn Cys Ala Arg	290	295	300		
cca gac caa gat gtg aaa ttc acc atc aag ttt caa gaa ttc agc cct	960				
Pro Asp Gln Asp Val Lys Phe Thr Ile Lys Phe Gln Glu Phe Ser Pro	305	310	315	320	
aac ctc tgg ggt cta gaa ttt cag aag aac aaa gat tac tac att ata	1008				
Asn Leu Trp Gly Leu Glu Phe Gln Lys Asn Lys Asp Tyr Tyr Ile Ile	325	330	335		
tct aca tca aat ggg tct ttg gag ggc ctg gat aac cag gag gga ggg	1056				
Ser Thr Ser Asn Gly Ser Leu Glu Gly Leu Asp Asn Gln Glu Gly Gly	340	345	350		
gtg tgc cag aca aga gcc atg aag atc ctc atg aaa gtt gga caa gat	1104				
Val Cys Gln Thr Arg Ala Met Lys Ile Leu Met Lys Val Gly Gln Asp	355	360	365		
gca agt tct gct gga tca gcc agg aat cac ggt cca aca aga cgc cca	1152				
Ala Ser Ser Ala Gly Ser Ala Arg Asn His Gly Pro Thr Arg Arg Pro	370	375	380		
gag cta gaa gct ggt aca aat ggg aga agt tca aca aca agt ccc ttt	1200				
Glu Leu Glu Ala Gly Thr Asn Gly Arg Ser Ser Thr Thr Ser Pro Phe					

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385		390		395		400			
gtg aag cca aat cca ggt tct agc acc gat ggc aac agc gcg ggg cat								1248	
Val Lys Pro Asn Pro Gly Ser Ser Thr Asp Gly Asn Ser Ala Gly His									
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tcc ggg aac aat ctc ctg ggg ggc ccg ggc gag ccc aaa tct tgt gac								1296	
Ser Gly Asn Asn Leu Leu Gly Gly Pro Gly Glu Pro Lys Ser Cys Asp									
		420		425		430			
aaa act cac aca tgc cca ccg tgc cca gca cct gaa ctc ctg ggg gga								1344	
Lys Thr His Thr Cys Pro Pro Cys Pro Ala Pro Glu Leu Leu Gly Gly									
		435		440		445			
ccg tca gtc ttc ctc ttc ccc cca aaa ccc aag gac acc ctc atg atc								1392	
Pro Ser Val Phe Leu Phe Pro Pro Lys Pro Lys Asp Thr Leu Met Ile									
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tcc cgg acc cct gag gtc aca tgc gtg gtg gtg gac gtg agc cac gaa								1440	
Ser Arg Thr Pro Glu Val Thr Cys Val Val Val Asp Val Ser His Glu									
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gac cct gag gtc aag ttc aac tgg tac gtg gac ggc gtg gag gtg cat								1488	
Asp Pro Glu Val Lys Phe Asn Trp Tyr Val Asp Gly Val Glu Val His									
		485		490		495			
aat gcc aag aca aag ccg cgg gag gag cag tac aac agc acg tac cgt								1536	
Asn Ala Lys Thr Lys Pro Arg Glu Glu Gln Tyr Asn Ser Thr Tyr Arg									
		500		505		510			
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Val Val Ser Val Leu Thr Val Leu His Gln Asp Trp Leu Asn Gly Lys									
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gag tac aag tgc aag gtc tcc aac aaa gcc ctc cca gcc ccc atc gag								1632	
Glu Tyr Lys Cys Lys Val Ser Asn Lys Ala Leu Pro Ala Pro Ile Glu									
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aaa acc atc tcc aaa gcc aaa ggg cag ccc cga gaa cca cag gtg tac								1680	
Lys Thr Ile Ser Lys Ala Lys Gly Gln Pro Arg Glu Pro Gln Val Tyr									
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Thr Leu Pro Pro Ser Arg Asp Glu Leu Thr Lys Asn Gln Val Ser Leu									
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acc tgc ctg gtc aaa ggc ttc tat ccc agc gac atc gcc gtg gag tgg								1776	
Thr Cys Leu Val Lys Gly Phe Tyr Pro Ser Asp Ile Ala Val Glu Trp									
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gag agc aat ggg cag ccg gag aac aac tac aag acc acg cct ccc gtg								1824	
Glu Ser Asn Gly Gln Pro Glu Asn Asn Tyr Lys Thr Thr Pro Pro Val									
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ctg gac tcc gac ggc tcc ttc ttc ctc tac agc aag ctc acc gtg gac								1872	
Leu Asp Ser Asp Gly Ser Phe Phe Leu Tyr Ser Lys Leu Thr Val Asp									
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aag agc agg tgg cag cag ggg aac gtc ttc tca tgc tcc gtg atg cat								1920	
Lys Ser Arg Trp Gln Gln Gly Asn Val Phe Ser Cys Ser Val Met His									
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1968

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 Gly Lys

1977

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 35 40 45  
 Gln Gly Leu Val Leu Tyr Pro Gln Ile Gly Asp Lys Leu Asp Ile Ile  
 50 55 60  
 Cys Pro Lys Val Asp Ser Lys Thr Val Gly Gln Tyr Glu Tyr Tyr Lys  
 65 70 75 80  
 Val Tyr Met Val Asp Lys Asp Gln Ala Asp Arg Cys Thr Ile Lys Lys  
 85 90 95  
 Glu Asn Thr Pro Leu Leu Asn Cys Ala Arg Pro Asp Gln Asp Val Lys  
 100 105 110  
 Phe Thr Ile Lys Phe Gln Glu Phe Ser Pro Asn Leu Trp Gly Leu Glu  
 115 120 125  
 Phe Gln Lys Asn Lys Asp Tyr Tyr Ile Ile Ser Thr Ser Asn Gly Ser  
 130 135 140  
 Leu Glu Gly Leu Asp Asn Gln Glu Gly Gly Val Cys Gln Thr Arg Ala  
 145 150 155 160  
 Met Lys Ile Leu Met Lys Val Gly Gln Asp Ala Ser Ser Ala Gly Ser  
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 Ala Arg Asn His Gly Pro Thr Arg Arg Pro Glu Leu Glu Ala Gly Thr  
 180 185 190  
 Asn Gly Arg Ser Ser Thr Thr Ser Pro Phe Val Lys Pro Asn Pro Gly  
 195 200 205  
 Ser Ser Thr Asp Gly Asn Ser Ala Gly His Ser Gly Asn Asn Leu Leu  
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 Gly Gly Pro Gly Ile Val Leu Glu Pro Ile Tyr Trp Asn Ser Ser Asn  
 225 230 235 240  
 Ser Lys Phe Leu Pro Gly Gln Gly Leu Val Leu Tyr Pro Gln Ile Gly  
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 Asp Lys Leu Asp Ile Ile Cys Pro Lys Val Asp Ser Lys Thr Val Gly  
 260 265 270  
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 275 280 285  
 Arg Cys Thr Ile Lys Lys Glu Asn Thr Pro Leu Leu Asn Cys Ala Arg  
 290 295 300  
 Pro Asp Gln Asp Val Lys Phe Thr Ile Lys Phe Gln Glu Phe Ser Pro  
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 Asn Leu Trp Gly Leu Glu Phe Gln Lys Asn Lys Asp Tyr Tyr Ile Ile

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Ser	Thr	Ser	Asn	Gly	Ser	Leu	Glu	Gly	Leu	Asp	Asn	Gln	Glu	Gly	Gly	325	330	335
Val	Cys	Gln	Thr	Arg	Ala	Met	Lys	Ile	Leu	Met	Lys	Val	Gly	Gln	Asp	340	345	350
Ala	Ser	Ser	Ala	Gly	Ser	Ala	Arg	Asn	His	Gly	Pro	Thr	Arg	Arg	Pro	355	360	365
Glu	Leu	Glu	Ala	Gly	Thr	Asn	Gly	Arg	Ser	Ser	Thr	Thr	Ser	Pro	Phe	370	375	380
Val	Lys	Pro	Asn	Pro	Gly	Ser	Ser	Thr	Asp	Gly	Asn	Ser	Ala	Gly	His	385	390	395
Ser	Gly	Asn	Asn	Leu	Leu	Gly	Gly	Pro	Gly	Glu	Pro	Lys	Ser	Cys	Asp	405	410	415
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Pro	Ser	Val	Phe	Leu	Phe	Pro	Lys	Pro	Lys	Asp	Thr	Leu	Met	Ile		435	440	445
Ser	Arg	Thr	Pro	Glu	Val	Thr	Cys	Val	Val	Val	Asp	Val	Ser	His	Glu	450	455	460
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Asn	Ala	Lys	Thr	Lys	Pro	Arg	Glu	Gln	Tyr	Asn	Ser	Thr	Tyr	Arg		485	490	495
Val	Val	Ser	Val	Leu	Thr	Val	Leu	His	Gln	Asp	Trp	Leu	Asn	Gly	Lys	500	505	510
Glu	Tyr	Lys	Cys	Lys	Val	Ser	Asn	Lys	Ala	Leu	Pro	Ala	Pro	Ile	Glu	515	520	525
Lys	Thr	Ile	Ser	Lys	Ala	Lys	Gly	Gln	Pro	Arg	Glu	Pro	Gln	Val	Tyr	530	535	540
Thr	Leu	Pro	Pro	Ser	Arg	Asp	Glu	Leu	Thr	Lys	Asn	Gln	Val	Ser	Leu	545	550	555
Thr	Cys	Leu	Val	Lys	Gly	Phe	Tyr	Pro	Ser	Asp	Ile	Ala	Val	Glu	Trp	565	570	575
Glu	Ser	Asn	Gly	Gln	Pro	Glu	Asn	Tyr	Lys	Thr	Thr	Pro	Pro	Val		580	585	590
Leu	Asp	Ser	Asp	Gly	Ser	Phe	Phe	Leu	Tyr	Ser	Lys	Leu	Thr	Val	Asp	595	600	605
Lys	Ser	Arg	Trp	Gln	Gln	Gly	Asn	Val	Phe	Ser	Cys	Ser	Val	Met	His	610	615	620
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